

# The TPC

Ties Behnke, DESY

Field Cage Status

Infrastructure Status

Electronics Status

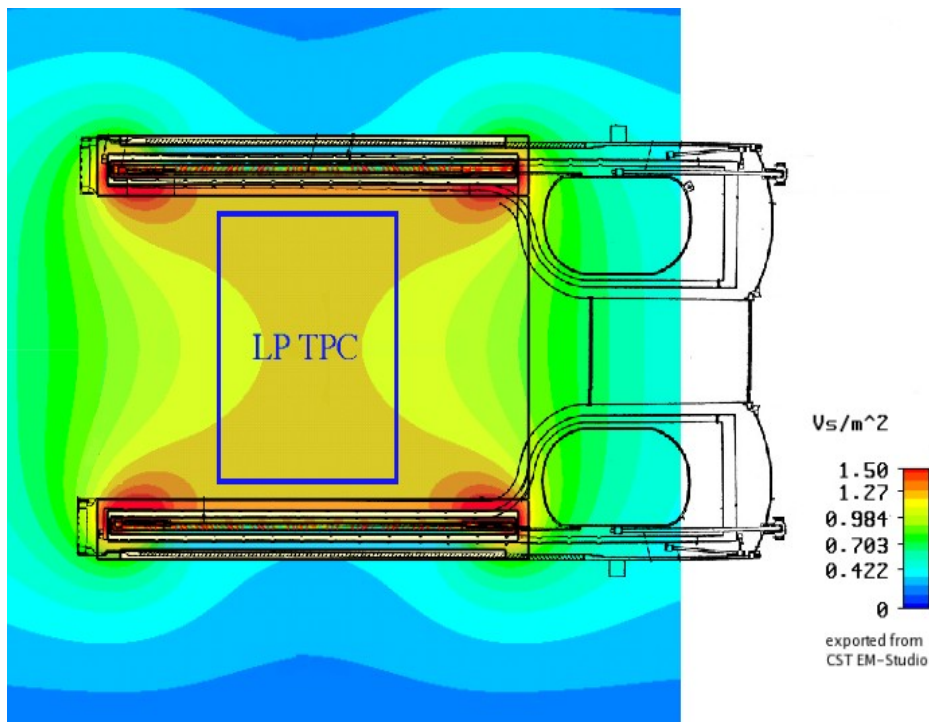
Others (Auxiliary systems)

The work described in here has been done in close collaboration with the LC-TPC collaboration

# The TPC fieldcage

Goal: construction of a field cage for a TPC to be used within the EUDET test beam infrastructure

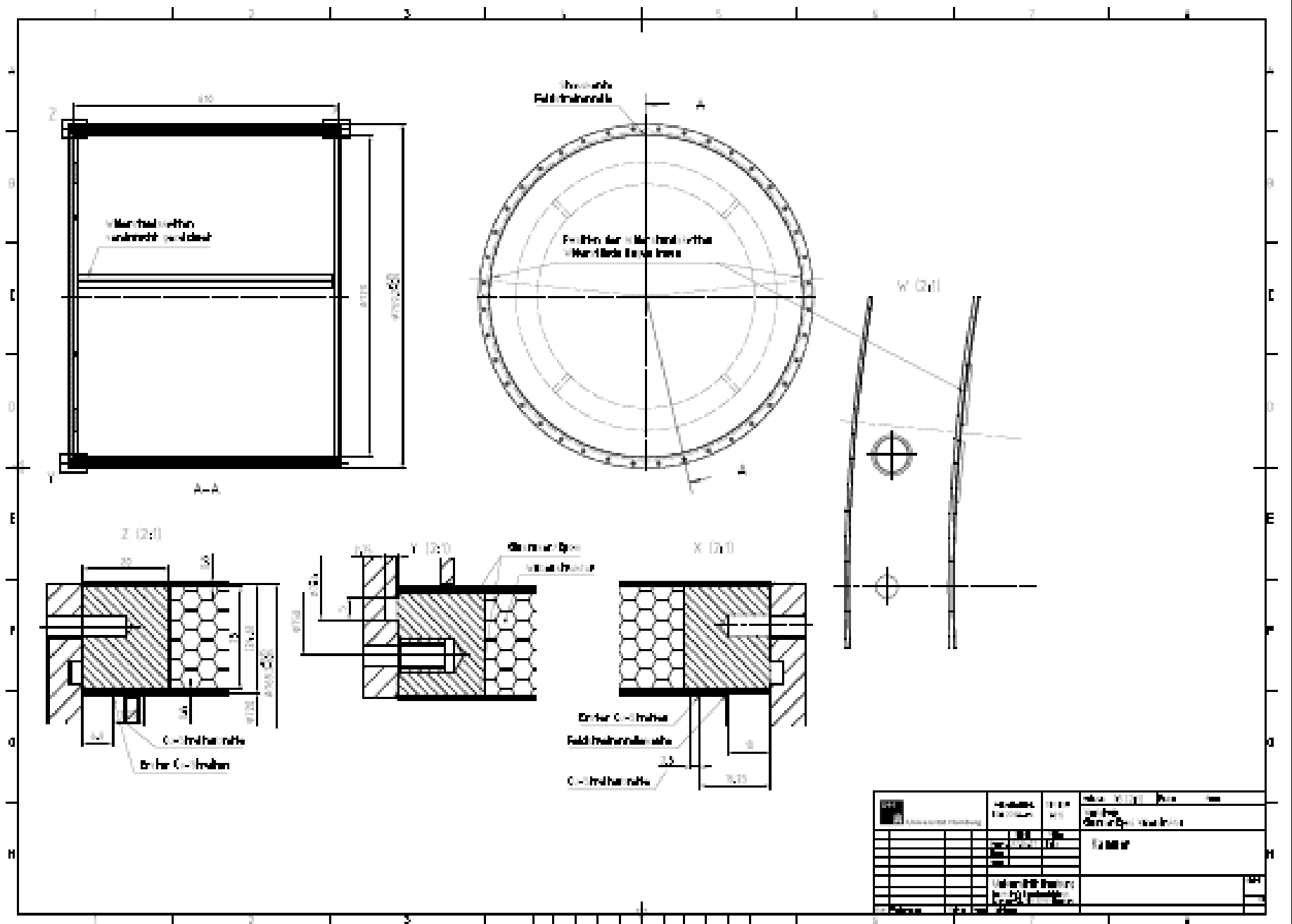
Dimensions: defined through the magnet (PCMAG)



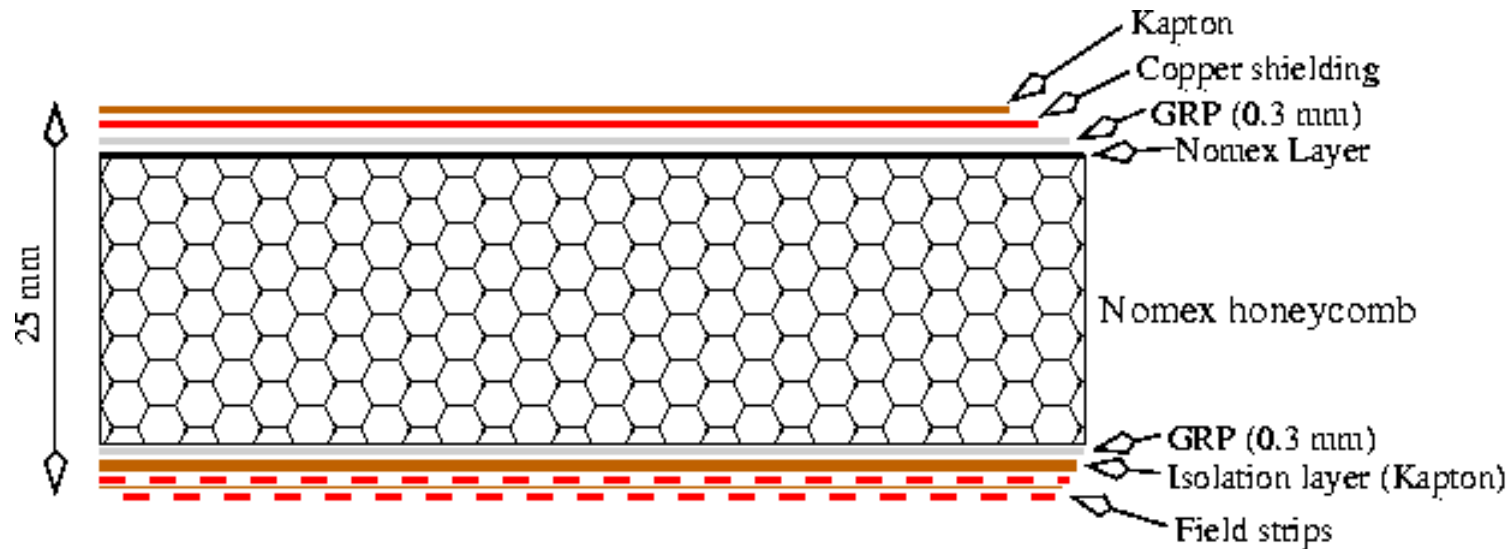
Diameter 76cm  
Length 61 cm

Peter Schade, DESY

# The Design



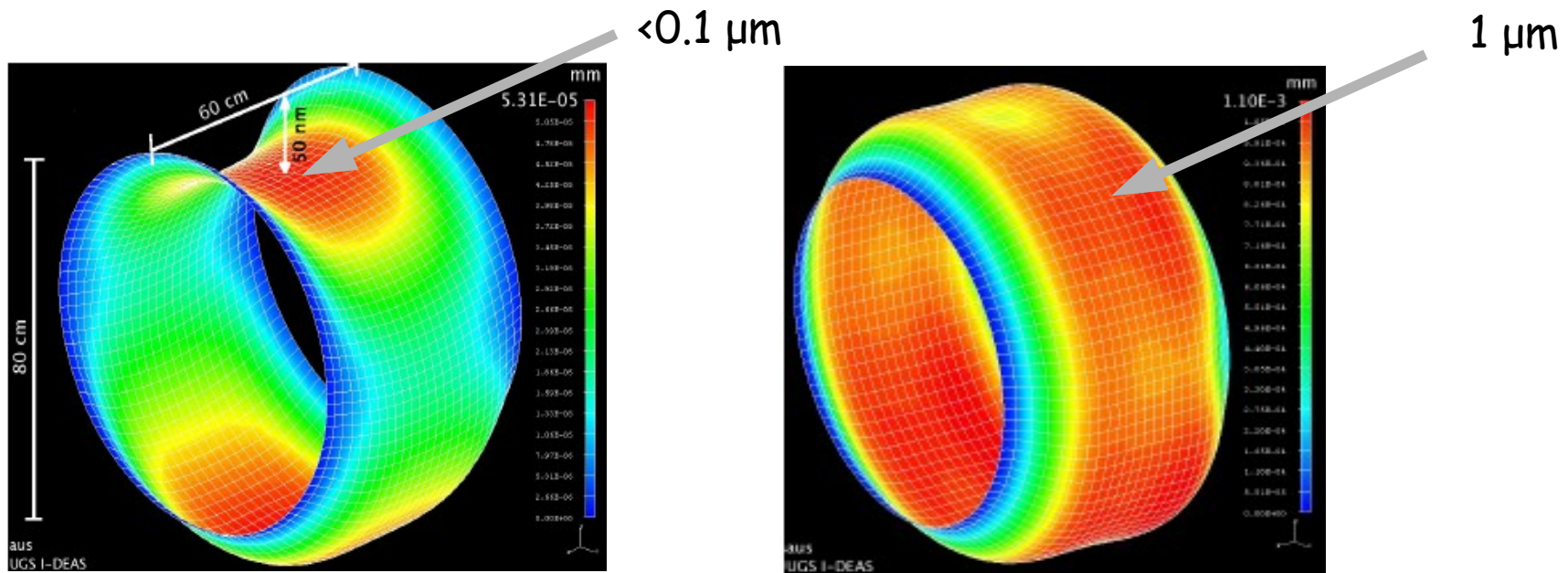
# The Design



Challenge is the design of the wall of the field cage:

- light weight, thin, but very stable
- solution: composite structure,

# Simulation of the Structure



Sag of the field cage under its own weight

Inflation of the field cage with 100 mbar overpressure

Planned structures is mechanically sound and meets requirements.

Experimental verification is pending

# Schedule

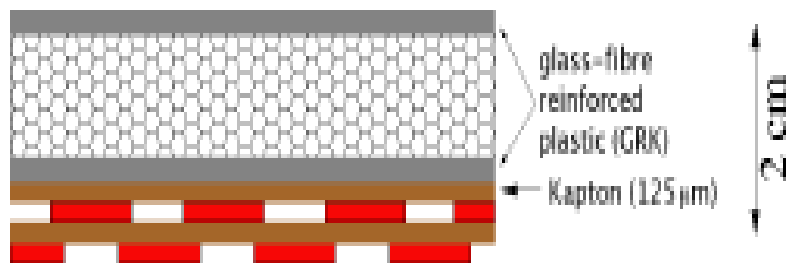
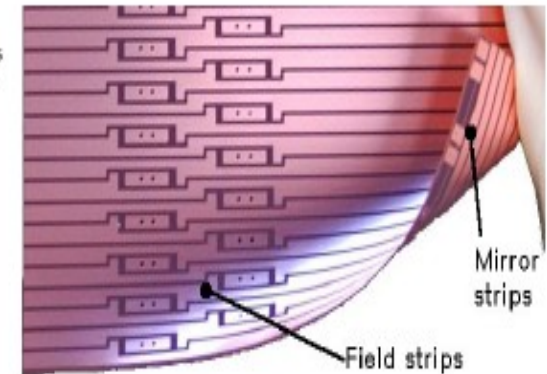
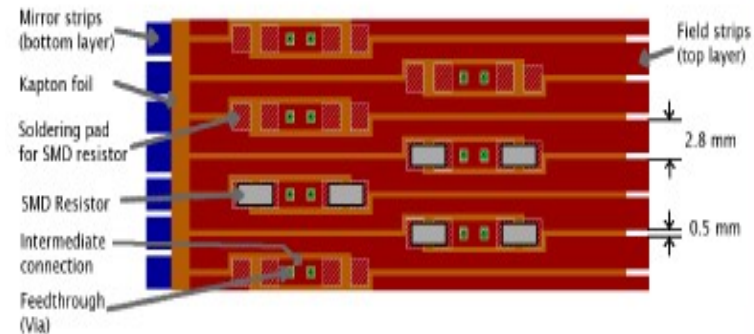
Design of field cage (DESY + LC-TPC collaboration): finished

Negotiations with vendor for production of field-cage:

- Done with three companies
  - Selection of vendor December 2006
  - Detailed negotiations during January February 2007
  - Vendor pulls out due to technical problems in February 2007
- New search for additional vendors started in Spring 2007
  - Detailed negotiations started in April, test pieces received May and August 2007
  - Final agreement expected early September
- Schedule: delivery of Field Cage in November (5 month late)

# Field shaping strips

Detailed design of field shaping strips finished including detailed simulation



Production of first full size test piece failed

- Alternative technical solution has been developed
- Test pieces have been successfully produced, waiting for samples, then finalization
- Compatible with field cage production schedule

# Interfaces

Interface between field cage and user groups has been defined

Design work on end plate and several readout structures is progressing within LC-TPC



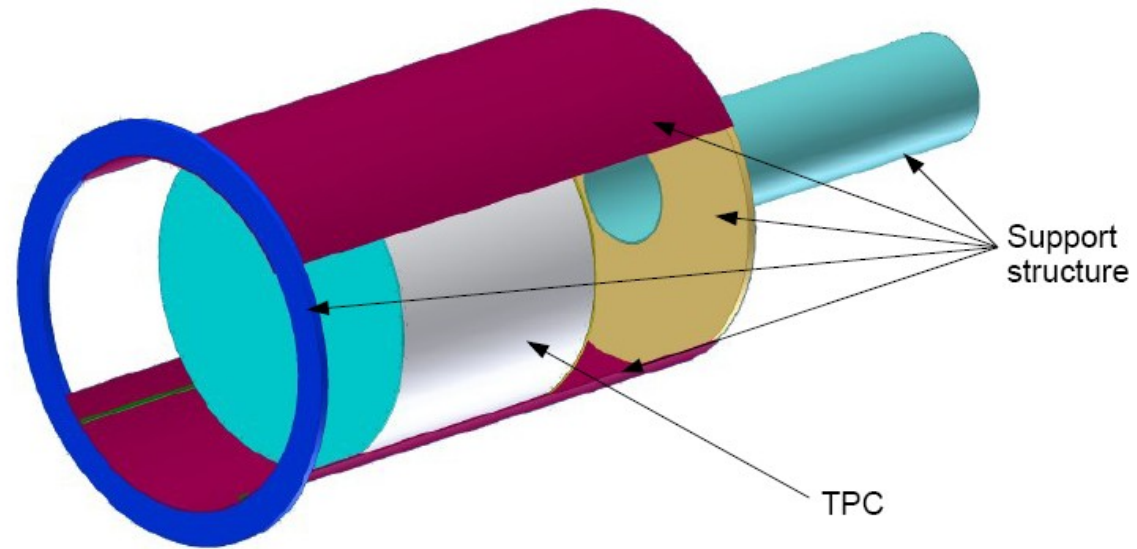
Drawing of the endplate (LC-TPC)



# Integration of Field Cage

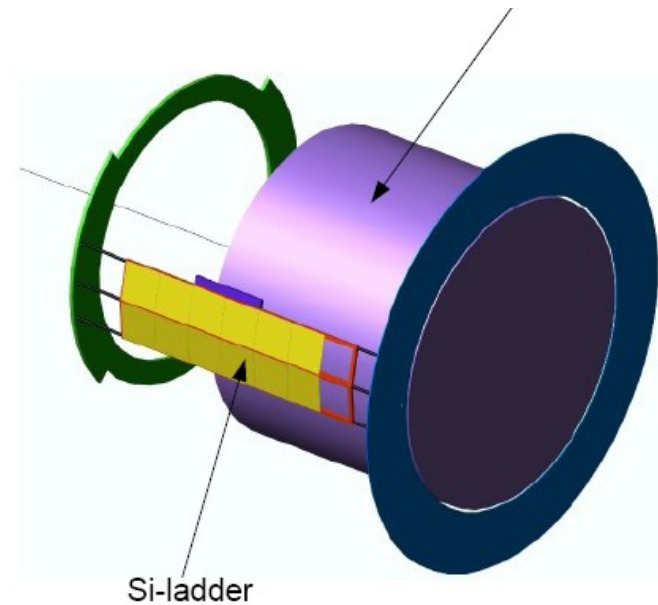
Integration into Magnet Facility

Support structure  
movable structure



Instrumentation

SI detectors  
cosmic trigger hodoscopes



# Readout Electronics

Two approaches are being followed:

"traditional" TPC electronics

Preamp - FADC - Signal processing  
based on Alice electronics

Preamp Version one successfully tested end 2006

Preamp Version two developed, submitted, expected for fall 2007

FADC + processing chips have been ordered, material for 1000 channel demonstrator are in hand

(there is still hope that a full system is operational end 2007)

# DAQ

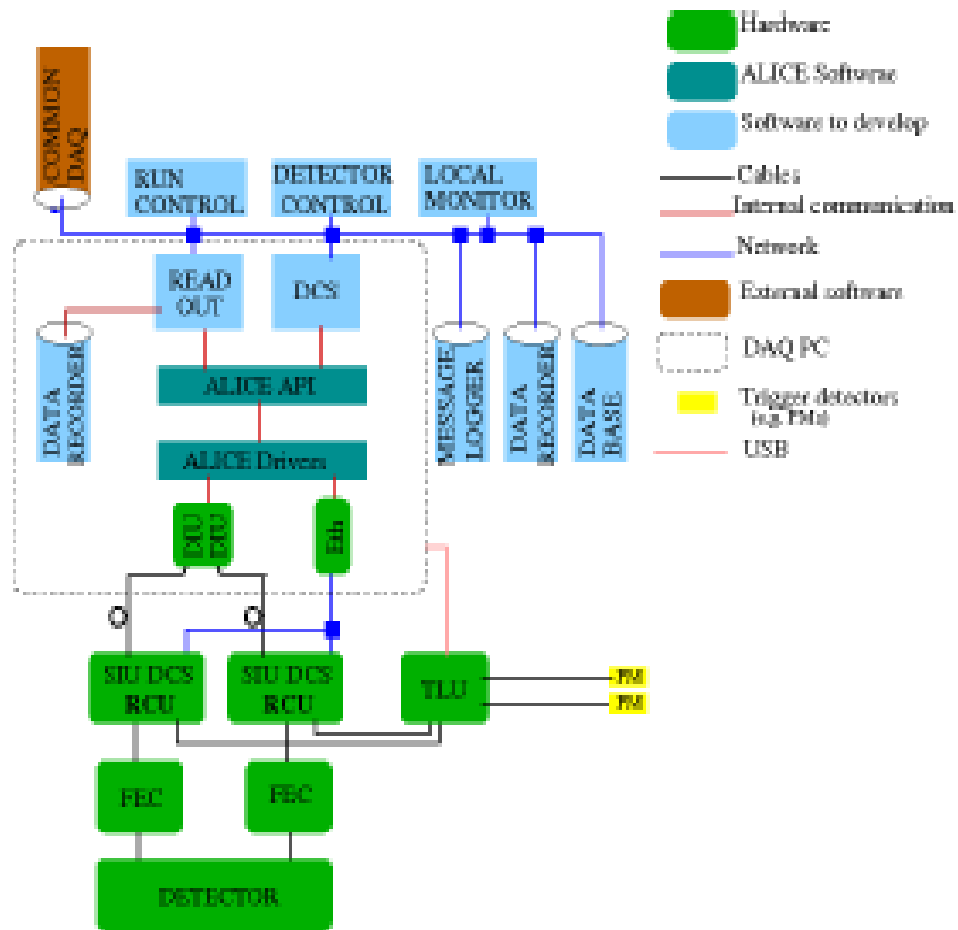


Figure 2: A schematic view of a possible design of the local DAQ

DAQ is based on ALICE DAQ

adopted to the ILC environment

and designed within the EUDET DAQ schemes

# Auxiliary Systems

HV System: simple system is in hand, more sophisticated system (software controls, some hardware) will be developed starting fall '07

Slow controls: simple system exists, hardware has been ordered to extend this for large prototype operation

Fall 2007: new student will start to further develop the system negotiations are under way with external partner (Siegen University) to take over part of this responsibility

# Overall Schedule

Fieldcage: delayed by ca 6 month, but now seems to be on track  
(most technical problems have been solved)

Fieldcage support and monitoring: on track for delivery in time for the  
field cage availability

Electronics: Hope to meet major milestone end of this year,  
production of full scale readout on track for commissioning of LC-TPC  
middle 2008

Auxiliaries: on Track, tough final systems are expected only in 2 quarter 2008

Summary: Overall project is progressing well, though with some delays  
due to hardware problems.

# Financial Status

Hamburg: one scientist payed by EUDET: budget for 07/08 spent/ will be spent

DESY: Field cage

- one postdoc since 1/07
- estimated cost 10k, actual cost will be around 15k
- estimated cost HV 10k, will partially cover for field cage cost overrun

Electronics: (Lund/ CERN) (information might be wrong or incomplete)

- EUDET money is supplemented by significant additional funds to provide a significant number of channels to the community in time with the large Prototype field cage